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University of Hawaii at Manoa

DIV. OF WATER & Natural Energy Institute  
LAND DEVELOPMENT  
Holmes Hall 240 Holo Street • Honolulu, Hawaii 96822

July 31, 1990

Mr. Duane Kanuha  
Director  
Planning Department  
County of Hawaii  
25 Aupuni Street  
Hilo, Hawaii 96720

Dear Mr. Kanuha:

As required in the County of Hawaii Planning Commission's geothermal resources permit (GRP 89-1), we have enclosed five (5) copies each of the June, 1990 monthly report and April-June 1990 quarterly report.

If you have any questions, please call me at 522-5620.

Sincerely yours,

Harry Olson  
Hawaiian Electric Industries/  
Spark Matsunaga Fellow in  
Geothermal Energy Research

Enclosures: June monthly report  
March quarterly report

JUNE 1990 MONTHLY REPORT

Scientific Observation Hole (SOH) Program

Geothermal Resource Permit: GRP 89-1

Lilewa, Kapoho, and Halekamahina, Hawaii

TMK: 1-2-10:01; 1-4-01:02; and 1-4-02:32

Hawaii Natural Energy Institute

University of Hawaii

July 1990

## SUMMARY

This document presents a monthly report to the County of Hawaii Planning Department to support the scientific observation hole (SOHs) program in the Kilauea middle and lower east rift zone. The SOHs are for scientific observation purposes only. The holes will not be flow-tested or produced. The information to be gained from the SOHs will provide an assessment of subsurface geological conditions, groundwater level and composition, temperature, drilling conditions, an inventory of possible mineral and geothermal resources, and an eruptive history of the island to the depth drilled.

This report addresses: occurrence and duration of any start-up, shut-down, and operation mode of any SOH/facility; performance testing, evaluation, calibration checks, and adjustment and maintenance of the continuous emission monitor(s) that have been installed; and emission measurements.

# ALPHA MICROSYSTEMS

1550 Akolea Place  
Hilo, Hawaii 96720  
(808) 935-7985

HAWAII NATURAL ENERGY INSTITUTE  
2540 Dole Street  
Honolulu, HI 96822

Attn Arthur S. Seki

July 5, 1990

Dear Art,

This report covers the period Jun. 1, to Jun. 30, 1990.

FENCELINE HAI. This instrument operated normally until June 15. After that, the analyzer was intermittantly inoperative due to power outages or because it was shut down by people dismantling the Plant. The instrument was removed from service on June 25 and reverted to Bechtel Corp. (purchasers of the Plant equipment.)

GILMAN HAI. This instrument operated normally throughout the month with two exceptions: 6 hours data loss on June 15 due to a power outage, and 7 hours loss on June 21 due to a jam of the Lead Acetate tape. Readings were normal and calibrations routine. Data capture was 98%.

SOK-1 HAI. This station operated normally throughout the month. However, there was a substantial amount of data loss between 6-6-90 and 6-13-90 because of drill-site shut-down. Some data was collected during that time, but was unable to corelate the data with actual time, so decided to consider all data during that period invalid. The valid data capture during June was 75%. Calibrations were normal and only minor corrections were necessary.

WOODS HAI. This analyzer operated normally during the month of June with two exceptions: A 5 hour power outage on June 15 and a 6 hour outage on June 21. Calibrations were stable and routine. Data capture was 98%.



WOODS MET. This station operated with only minor problems during June. A 4 hour power outage on June 15, and a 6 hour outage on June 21 caused a 10 hour data loss. The tipping-bucket rain gage was knocked over twice by the local livestock, but caused no data loss. A problem with the right channel of the chart recorder makes reduction of data difficult and the multiplexer has been eliminated as the cause. The only thing left is the chart recorder itself. Will attempt field repairs.

T.P. MET. There were no problems at all at this station during June. Data capture was 100%. Calibrations were stable and routine. No corrections or adjustments were necessary.

SOX-1 MET. This station operated normally during the month of June with the exception of intermittent power outages during drill-rig shut-down. Data was collected during that period, but was unable to correlate the data that was collected with actual time, so all the data was declared invalid.

SOX-4 COLORTEK. These cards were routinely replaced and did not give any indications of color change.

Enclosed:

H2S Data Reduction for Fenceline, Gilman, SOX-4 and Woods  
for June 1990.

Average, Maximum and total H2S for the above stations.

Meteorological Data Reduction for Woods, T.P., and SOX-4.  
June 1990.

Synopsis of Woods and T.P. Met Data for June, 1990.

Copy of Station Logs, June, 1990.

July Invoice

J-155 Monday 6-4-90

SOH-1 0810 Clouds 95% WS&DIR 360 @ 3-5

Operating normally. No adjustments required.

LOUGHLIN 0910 Clouds 80% WS&DIR 360 @ 3-5

Something is wrong at this station. Sound reading is about 70 db, but ambient level can't be much more than about 40. Calibration check of meter and recorder is right on, but I believe that reading is much too high. Removed mike from the cable and installed on the meter. Sound level now about 35-45 db. Replaced mike on cable and tested again. Reading still 35-45 db. I don't know what caused problem. Maybe there was corrosion on the pin contacts.

J-157 Wednesday 6-6-90

SOH-1 0810 Clouds 85% WS&DIR 290 @ 2-3

Operating normally. Chart reserve and Pen O.K.

LOUGHLIN 0845 Clouds 25% WS&DIR 310 @ 4-5

Same problem as on Monday. Made no adjustments because I want Ron Darby to see the readings as-is.

Re-examined Sound station sites with Ron Darby and tested calibration. Confirmed that Loughlin station operating improperly. Traced problem to defective extension cable between mike and sound meter. We removed the defective cable, hooked together two 10' cables, installed and tested. Everything now seems normal.

J-159 Friday 6-8-90

SOH-1 0755 Clouds 90% WS&DIR 360 @ 4-5

This station operating normally. No adjustments required for Sound meter, 3 db increase made to recorder.

LOUGHLIN 0828 Clouds 85% WS&DIR 360 @ 4-5

Normal operation. Replacing the mike cable did the trick. Recalibrated sound meter to 110.0 from 110.2 db. The chart recorder required no adjustments.

J-162 Monday 6-11-90

SOH-1

Station is inoperative. Drill rig shut down. I was told that The generator is running during the night to provide light and power, and also during the day. However, am not able to provide exact times for down-time and operation.

LOUGHLIN 0825 Clouds 60% WS&DIR 360-5-7

Operating normally. No adjustments required.

J-164 Wednesday 6-13-90

SOH-1

Station is inoperative.

LOUGHLIN 0845 Clouds 80% WS&DIR Calm

Operating normally. No adjustments required

J-166 Friday, 6-15-90  
 SDH-1 0755 Clouds 80% WS&DIR Calm  
 Started drilling again yesterday. Station now operating normally again. Sound meter calibration to 110.0 from 109.6. No adjustments to recorder. Renewed chart. Chart reserve and Pen O.K.  
 LOUGHLIN 0845 Clouds 90% WS&DIR Calm  
 This station was operating normally until 0800 this morning when power was shut off in the Pahoa area for power-line repair. Expected power return about noon-1300. Unable to Calibrate. Renewed chart, reserve O.K., Replaced pen.

J-169 Monday, 6-18-90  
 SDH-1 0755 Clouds 50% WS&DIR 45 @ 8-10  
 Chart was jammed. No data since 6-15. Cleared jam and tested. Chart reserve and pen O.K.  
 LOUGHLIN 0835 Clouds 50% WS&DIR 20 @ 8-10  
 Station operating normally...No problems

J-171 Wednesday, 6-20-90  
 SDH-1 0800 Clouds 100%,Rain WS&DIR 100 @ 2-3  
 Station operating normally, but Chart pen had run dry, so some data was lost. Replaced pen, chart reserve O.K.  
 LOUGHLIN 0840 Clouds 100%,Rain WS&DIR 90 @ 2-3  
 Operating normally. Replaced chart, Pen O.K.  
 \*\*\* Received spare Microphones from Quest...\$202.54

J-173 Friday, 6-22-90  
 SDH-1 0810 Clouds 70% WS&DIR 50 @ 6-8  
 Station operating normally. Checked calibration of both meter and recorder...Adjusted meter to 110.0 from 110.2. Made 1 db increase adjustment to chart recorder.  
 LOUGHLIN 0835 Clouds 90% WS&DIR 50 @ 6-8  
 Station operating normally. Checked calibration of both meter and recorder. No adjustments were required to either. Chart reserve and pen O.K.

J-176 Monday 6-25-90  
 SDH-1 0800 Clouds 75% WS&DIR 35 @ 6-8  
 Station operating normally. No problems  
 LOUGHLIN 0845 Clouds 90% WS&DIR 40 @ 8-10  
 Station operating normally. No problems

J-178 Wednesday 6-27-90  
 SDH-1 0820 Clouds 100% rain WS&DIR 85 @ 2-3  
 Station operating normally. No problems.  
 LOUGHLIN 0840 Clouds 100% rain WS&DIR 90 @ 0-2  
 Pen ran dry. (black) these seem to have a very short life. Replaced with red, which last longer. Some data lost.

J-180 Friday, 6-29-90  
 SDH-1 0810 Clouds 100% WS&DIR 350 @ 4-5  
 Station operating normally. Replaced chart and Pen. Calibrated meter to 110.0 from 109.7 db. Increased recorder setting by 1 db.  
 LOUGHLIN 0855 Clouds 90% WS&DIR 35 @ 6-8  
 Station operating normally. Replaced chart, Pen O.K. Checked meter calibration, no adjustment necessary. Decreased recorder setting by 1 db.

J-155 Monday 6-4-90

Woods HAIRange  $\phi$  - 2 ppb

Flow steady @ 3.0, chart O.K. - Replaced Lead Acetate

Tygon Dry - cleaned Sample Chart - Pump &amp; Bubbler O.K.

Check 23.9%, up .1%

Optics 1530-1540, up 10  $\mu$ , adj. to 1540-1540

Range - High 11 Low 11

Zero Calib - 25 2 1 0 0

Span Calib - exp 50 50 50 50 (span Pot) 50

Act 31 45 47 48 (No Right) 50

Woods Met

Operating Normally - Chart O.K. - Re-balanced Rom Gage

J.P. Met

Operating Normally - Chart + Pot O.K.

SOH-I Met

Operating Normally - Minor Span to Chart Recorder Drive

Encelme HAIRange  $\phi$  - 2 ppb

Flow steady @ 3.0, chart O.K., Replaced Lead Acetate O.K.

Tygon Dry - Pump &amp; Bubbler O.K.

Check 25.5%, up .1%

Optics 1840-1830, down 10  $\mu$ , No Adj.

Zero Calib 24 11 4 3 0

Enlman HAIRange  $\phi$  - 2 ppb

Flow steady @ 3.0, chart O.K., Replaced Lead Acetate

Dried Tygon - cleaned Sample Chart - Pump &amp; Bubbler O.K.

Check 19.2% down .1%, Adj Cycle Time 1 Right

Optics 1880-1880, down 10  $\mu$ , No adj.

Zero Calib 19 6 0 0

SOH-I HAIRange  $\phi$  - 2 ppb

Tygon Dry - Pump &amp; Bubbler O.K.

Check 17.5%, up .4%

Optics 1800-1780, down 20  $\mu$ , adj. to 1780-1780

Flow steady @ 2.5, chart &amp; Lead Acetate O.K.

Zero Calib 16 4 1 0



J-157 Wednesday 6-6-90

Woods HAIRange  $\phi$  - 3 ppb

Flow steady @ 3.0, Replaced Chart, Lead Acetate D.K.

Drained Tygon - Filter Bubbler - Pump O.K.

Check 23.8%, down .1%

Optics steady @ 1540-1540

Zero Calib 23 10 2  $\phi$ Woods Met

Operating Normally - Chart O.K.

T.P. Met

Operating Normally - Chart + B&amp;B O.K.

SOH-1 Met

Operating Normally - Chart O.K.

Fence Line HAIRange  $\phi$  - 3 ppb

Flow steady @ 3.0, Renewed Chart, Lead Acetate O.K.

Drained Tygon - Pump + Bubbler O.K.

Check 25.1%, up .1%

Optics steady @ 1840-1840

Range: High 1.1 Low 1.1

Zero Calib 25 4 1  $\phi$ 

Spray Calib - Exp 50 50 50 50 50

Act 29 43 49 50 50

B. Linn HAIRange  $\phi$  - 3 ppb

Flow steady @ 3.0, Renewed Chart, Lead Acetate O.K.

Tygon Dry - Pump + Bubbler O.K.

Check 19.17%, down .1%

Optics 1890-1890, down 10%, No adj.

Zero Calib 20 6 3 1  $\phi$ SOH-1 HAIRange  $\phi$  - 2 ppb

Flow steady @ 2.5, Renewed Chart, Lead Acetate O.K.

Tygon Dry - Pump + Bubbler O.K.

Check 17.17%, down .4%

Optics 1750-1760, up 10%, adj. 1760-1760

Zero Calib 18 5 3 0  $\phi$

J-159 Friday 6-8-90

Woods HAI

Range 0-3 ppb

Flow steady @ 3.0, chart + Lead Acetate O.K.

Drained Tygon - Filled Bobbin - Pump O.K.

Check 23.9%, up - 170

Optics 1540-1570, up 30 m, adj to 1570-1570

Zero Calib 14 3 - 0 0

Woods, Met.

Operating Normally - Chart O.K.

T.P. Met.

Operating Normally - Received Chart - Bath 12-18

SDH-1 Met.

Operating Normally - Received Chart

Encelina HAI

Range 0-3 ppb

Drained Tygon - Cleared Sample Chamber - Pump + Bobbin O.K.

Flow steady @ 3.0, chart O.K. - Replaced Lead Acetate

Check 25.2%, up - 170

Optics 1840-1830, down 10 m, No adj.

Zero Calib 24 6 0 1 0

Elman HAI

Range 0-3 ppb

Flow steady @ 3.0, chart + Lead Acetate O.K.

Tygon Dry - Pump + Bobbin O.K.

Check 19.8%, up - 170

Optics 1890-1920, up 30 m, adj to 1920-1920

Range - High Lit Low Lit

Zero Calib 19 8 3 1 1 (Tweak Pot) 0

Span Calib Exp 50 50 50 50 50

Act 37 48 48 50 50

SDH-1 HAI

Range 0-2 ppb

Flow steady @ 2.5, chart + Lead Acetate O.K.

Tygon Dry - Pump + Bobbin O.K.

Check 19.5%, up 2.470 - Adj Span Pot 1/4 right

Optics steady @ 1760-1760

Range - High Lit Low Lit

Zero Calib 12 5 1 1 0

COLOR TEK - Received Colored Cards - No Color Change apparent

J-162 Monday 6-11-90

Woods HAIRange  $\phi$  - 2 ppb

Flow steady @ 3.0, chart + Lead Acetate OK

Tygon Dry - Pump + Bubbler OK

Check 24.0%, up .1%

Optics 1570-1580, down 10%, No adj.

Zero Calib 23 5 2 0 0

Woods Met

Operating Normally - Chart OK

T.P. Met

Operating Normally - Chart + Ref OK

SOH-1 Met

Inoperative - No Power - Drill Rig Shut Down

Frederic HAIRange  $\phi$  - 2 ppb

Flow steady @ 3.0, chart + Lead Acetate OK

Tygon Dry - Pump + Bubbler OK

Check 25.1%, down .1%

Optics 1850-1830, down 20%, adj to 1830-1830

Zero Calib 22 2 1 1 0

William HAIRange  $\phi$  - 3 ppb

Flow steady @ 3.0, chart + Lead Acetate OK

Tygon Dry - Pump + Bubbler OK

Check 19.2% - Steady

Optics 1920-1900, down 20%, adj to 1900-1900

Zero Calib 19 4 0 0

SOH-1 HAI

Inoperative - No Power - Drill Rig Shut Down



5-16 4 Wednesday 6-13-90

Woods M-1

Range 0-2 ppb

Flow steady @ 3.0, Renewed Churn, lead Acetate 0.8  
Tygon Dmg - Pump + Bubbler OK  
Check steady @ 0.4070

Optics 1570-1550, down 20, adj. 1550-1530  
Range - High 1.1 low 1.1

Zero Calib 24 6 2 1 0

Span Calib - Exp 50 50 50 50  
Act 50 50 50 49 50

Woods M-2

Operating Normally - Replaced Churn - Rain Gauge OK  
IF M-1  
Operating Normally - Churn + G-1 OK  
S-1 M-1

Inoperative - No Power - Null Ring shut Down

Pen-eline M-1

Range 0-2 ppb

Flow steady @ 3.0, Replaced Churn, lead Acetate 0.8  
Tygon Dmg - Filled Bubbler - Pump OK  
Check 25-20, up 1.10

Optics steady @ 1530-1530

Zero Calib 27 4 2 0 0

William M-1

Range 0-2 ppb

Flow steady @ 3.0, Renewed Churn - lead Acetate 0.8  
Tygon Dmg - Pump + Bubbler OK  
Check 17.5-20, down 3.0  
Optics 1910-1900, down 10-2, No Adj.  
Zero Calib 18 9 2 0

504-1 M-1

Inoperative - No Power - Ring shut down

J-166 At Friday 6-15-70

Woods HAIRange  $\phi$  - 3 ppb

Power Turned OFF From 0800 To 1200 Today.

Unable to Test operation

Woods Met

Power off - 0800-1200 - Replaced MUX

TP Met

Operating Normally - Renewed Chart - Batt. OK @ 12.06

SOH-1 Met

Operating Normally - Renewed Chart - Calibration Check

Fence-line HAIRange  $\phi$  - 3 ppb

Power OFF 0800-1200 Today - unable to check calib

Gilman HAIRange  $\phi$  - 3 ppb

Power off 0800-1200 Today - unable to check

SOH-1 HAIRange  $\phi$  - 3 ppb

Flow adj to 3.0, chart OK - Replaced lead Acetate

Tygon Dry - Pump + Bubbler ON - Cleared Sample Chamber

Check 19.6  $\mu$ , sp. 190Optics 1780-1750, down 30  $\mu$ , adj to 1750-1750

Range - High IL Low IL

Zero Calib 18 4 2  $\phi$ 

Span Calib - Exp	50	50	50	50	(Span Pot Turn Right)	50
Act	31	45	47	49		50

J-169 Monday 6-18-90

Woods NAI

Range 0 - 3 ppb

Flow steady @ 3.0, Chart OK - Replaced Lead Acetate

Drained Tygon - Filled Bubbler - Cleaned Sample Chamber

Check 24.1%, up 1%

Optics 1550-1580, up 30 mV, adj to 1570-1570

Zero Calib 22 9 3 0 0

Woods Met.

Operating Normally - Chart OK, Multiplexer Normal

T.F. Met.

Operating Normally - Chart + Batt OK

SOH-Met.

Operating Normally - Chart OK

Fencline NAI

Range 0 - 3 ppb

Flow steady @ 3.0, Chart + Lead Acetate OK

Tygon Dry - Pump + Bubbler OK

Check 25.0%, down 2%

Optics 1820-1810, down 10 mV, No adj.

Zero Calib 22 6 -0 0

Gilman NAI

Range 0 - 3 ppb

Flow steady @ 3.0, Chart OK - Replaced Lead Acetate

Drained Tygon - Filled Bubbler - Cleaned Sample Chamber

Check steady @ 19.5%

Optics 1910-1900, down 10 mV, No Adj.

Range - High Lit Low Lit

Zero Calib 12 4 2 1 0

Span Calib - Exp 50 50 50 50

Act 39 45 49 50

SOH-LNAI

Range 0 - 3 ppb

Flow steady @ 3.0, Chart + Lead Acetate OK

Tygon Dry - Pump + Bubbler OK

Check steady @ 19.6%

Optics 1780-1800, up 20 mV, adj to 1800-1800

Zero Calib 12 3 0 1 0



J-171 Wednesday 6-20-90

Woods HAIRange  $\phi$  - 3 ppb

Flow steady @ 3.0, Renewed Chart, Lead Acetate OK

Tygon Dry - Pump + Bubbler OK

Check 23.9%, down .2%

Optics 1570-1530, down 40 $\mu$ , adj to 1530-1530Zero Calib 23 4 -0  $\phi$ Woods Met.

Operating Normally - Renewed Chart

T.P. Met

Operating Normally - Chart + Batt OK

SOH-1 Met

Operating Normally - Chart OK

Seawline HAIRange  $\phi$  - 2 ppb

+ Power switch was OFF - some data lost -

Flow steady @ 3.0, Renewed Chart, Lead Acetate OK

Drained Tygon - Pump + Bubbler OK

Check steady @ 25%

Optics steady @ 1820-1820

Zero Calib 72 -1 5 1  $\phi$ Gilman HAIRange  $\phi$  - 2 ppb

Flow steady @ 3.0, Renewed Chart, Lead Acetate OK

Tygon Dry - Pump + Bubbler OK

Check 19.6%, up .1%

Optics 1910-1890, down 20 $\mu$ , adj to 1890-1890Zero Calib 14 9 1  $\phi$ SOH-1 HAIRange  $\phi$  - 2 ppb

Flow steady @ 3.0, Renewed Chart, Lead Acetate OK

Tygon Dry - Pump + Bubbler OK

Check 20.7%, up .8%

Optics steady @ 1800-1800

Range High 1/1 Low 1 ppb High, adj for 1/1

Zero Calib 50 6 3 1  $\phi$ Span Calib - Exp 50 50 50 50 (span lot) 50  
Act 30 40 46 48 (1/2 Right) 50

J-173 Friday 6-22-90

Woods HAI

Range 0-3 ppb

Flow steady @ 3.0, chart &amp; lead Acetate OK

Tygon Dry - Pump &amp; Bubbles OK

Check steady @ 23.9%

Optics 1530-1540, up 10<sup>-2</sup>, adj to 1540-1540

Range High 1.1 Low 1.1

Zero Calib 21 9 3 0

Span Calib - Exp 50 50 50 50 (span pot) 50

Act 19 38 47 48 (1/4 Right) 50

Woods MetOperating Normally but Rain Edge was knocked over -  
Rebalanced & tested - O.K. - Chart OKT.P. Met

Operating Normally - Renewed Chart - Replaced Battery

SON-1 Met

Operating Normally - Chart OK

Fence-line HAI# Inoperative - Power Turned off at Instrument. Have  
been informed that power off condition will be  
Permanent on 6-25-90 - Instrument will belong to Becktel.Ellman HAI

Range 0-3 ppb

Flow steady @ 3.0, Replaced Chart - lead Acetate O.K.

Tygon Dry - Filled Bubbles - Pump OK

Check 19.8%, up .2%

Optics 1880-1890, up 10<sup>-2</sup>, adj to 1890-1890

Zero Calib 18 2 2 1 0

SON-1 HAI

Range 0-2 ppb

Flow steady @ 3.0, Chart &amp; lead Acetate OK

Tygon Dry - Pump &amp; Bubbles OK

Check 20.9%, up .1%

Optics 1810-1820, up 10<sup>-2</sup>, adj to 1820-1820

Zero Calib 18 5 2 0

Color-2-R

Replaced Cands - No color change Visible.

J-176 Monday 6-25-70

Woods HAIRange  $\phi$  - 3 ppb

Flow steady @ 3.0, chart &amp; lead acetate OK

Tygon Dry - Filled Bubbler - Pump O.K.

Check steady @ 23.9%

Optics 1540-1560, up 20  $\Omega$ , adj to 1560-1560

Range High 1:1 Low 1:1

Zero Calib 84 6 2  $\phi$ Woods Met

Rain Edge was tipped over again - Recalibrated &amp; Tested

T.P. Met

operating Normally - Replaced Chart

SOH-1 Met

operating Normally - No Problems

Seur-line HAIRange  $\phi$  - 2 ppb

\* This instrument operating Normally - Removed from service and removed fast chart.

Elliman HAIRange  $\phi$  - 2 ppb

Flow steady @ 3.0, chart &amp; lead acetate OK

Tygon Dry - Pump &amp; Bubbler O.K.

Check steady @ 19.8%

Optics 1910-1890, down 20  $\Omega$ , adj to 1890-1890

Range High 1:1 Low 1:1

Zero Calib 3 102 4 1  $\phi$ SOH-1 HAIRange  $\phi$  - 2 ppb

Flow steady @ 3.0, Replaced Chart, lead acetate OK

Tygon Dry - Filled Bubbler - Pump O.K.

Check 21.2%, up .3%

Optics 1830-1850, up 20  $\Omega$ , adj to 1850-1850

Range - High 1:1 Low 1:1

Zero Calib 20 4 1  $\phi$



J-178 Wednesday 6-27-90

Range  $\phi$  - 2 ppbFlow Woods LIAI

Flow steady @ 3.0, Renewed Chart, Lead Acetate OK

Tygon Dry - Pump &amp; Bubbles OK

Check 24.1%, up .2%

Optics 1560-1550, down 10 $\mu$ , No Adj.

Range - High 1:1 Low 1:1

Zero Calib 24 5 0 1 0

Woods Met

Operation Normally - Renewed Chart - Replaced MUX.

Tested Bias Battery on Rain Transducer.

T.P. Met

Operating Normally - Chart &amp; Batt. OK

SDH-1 Met

Operating Normally - Chart OK

Gilman HAIRange  $\phi$  - 2 ppb

Flow adjusted to 3.0, Renewed Chart, Lead Acetate OK

Tygon Dry - Pump &amp; Bubbles OK

Check 17.6%, down .2%

Optics 1880-1870, up 10 $\mu$ , adj. to 1890-1880

Range - High 1:1 Low 1:1

Zero Calib 18 7 3 1 0

Span Calib - Exp 50 50 50 50 50

Adj 34 47 49 49 50

No

Adj.

Necessarry

SDH-1 HAIRange  $\phi$  - 2 ppb

Flow steady @ 3.0, Renewed Chart, Lead Acetate OK

Tygon Dry - Pump &amp; Bubbles OK

Check 20.7%, down .3%

Optics 1830-1820, down 10 $\mu$ , No adj.

Range - High 1:1 Low 1:1

Zero Calib 21 9 2 0



J-180 Fildun 6-29-90

Woods HAT

Range 0-3 ppb

Flow steady @ 3.0, chart &amp; Lead Acetate O.K.

Tygon Dry - Pump &amp; Bubbler O.K.

Check 24.090, down .190

Optics steady @ 1560-1560

Range - High 1.1 Low 1.1

Zero Calib 22 8 -0 0

Woods Met

Operating Normally - Chart O.K.

T.P. Met

Operating Normally - Renewed Chart - Batt O.K. @ 12.42

SDH-1 Met

Operating Normally - Renewed Chart

Gilman HAT

Range 0-3 ppb

Flow steady @ 3.0, chart &amp; Lead Acetate O.K.

Tygon Dry - Pump &amp; Bubbler O.K.

Check 19.770, up .190

Optics 1910-1900, down 10 m, No adj.

Range - High 1.1 Low 1.1

Zero Calib 19 1 2 0 0

SDH-1 HAT

Range 0-2 ppb

Flow steady @ 3.0, Chart O.K. Replaced Lead Acetate

Drained Tygon - Filled Bubbler - Cleaned Sample Chart.

Check steady @ 20.990

Optics 1830-1810, down 20 m, adj to 1810-1810

Range - High 1.1 Low 1 ppb High, adj for 1.1

Zero Calib Exp 50 50 50 50 (Span Pot) 50

Act 24 41 48 49 (1/4 Right) 50

Colortek

Replaced Bands - No visible color change

# H2S CHART REDUCTION -- SOH-1 Station

From 6-1-90 to 6-30-90

HOUR:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Avg	Max	Total	
0601	**	**	**	**	**	**	**	**	*	*	1	1	1	2	2	2	2		2	2	2	2	2	1	1	2	24	
0602	1	1	1	1	1	1	2	2	1	1	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	39	
0603	1	1	2	2	2	0	1	1	2	2	2	1	1	1	1	2	2	1	1	1	1	2	2	1	1	2	33	
0604	1	1	1	1	1	1	2	1	2	2	2	2	2	2	2	1	1	1	2	2	1	1	1	1	1	2	34	
0605	1	1	2	1	1	1	1	1	0	1	1	2	2	2	2	2	2	1	2	1	1	1	2	2	1	2	33	
0606	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	0	0	0
0607	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	0	0	0
0608	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	0	0	0
0609	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	0	0	0
0610	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	0	0	0
0611	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	0	0	0
0612	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	0	0	0
0613	**	**	**	**	**	**	**	**	**	**	**	**	**	2	2	2	3	2	2	2	3	2	2	2	1	3	24	
0614	1	2	1	2	2	2	2	1	1	2	1	1	1	1	2	1	2	1	1	2	2	1	1	1	1	2	34	
0615	1	0	1	1	1	1	1	2	2	2	2	2	1	2	2	2	2	2	2	1	1	1	2	2	2	2	36	
0616	2	1	1	2	1	2	1	3	2	2	2	2	2	2	2	2	2	2	1	2	2	2	3	1	2	3	44	
0617	1	1	1	2	2	2	1	1	2	2	3	3	2	1	2	2	2	2	2	2	2	1	1	2	2	3	42	
0618	1	1	1	1	1	1	1	2	2	1	2	1	2	1	1	1	2	1	1	2	1	1	1	2	1	2	31	
0619	2	1	1	1	1	2	2	2	2	2	2	2	1	1	1	1	2	2	2	1	2	2	2	1	2	2	38	
0620	2	1	1	1	1	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	2	2	2	37	
0621	2	1	1	2	2	2	1	1	1	1	1	1	0	1	1	2	1	2	1	1	2	2	2	2	1	2	33	
0622	2	2	2	2	2	2	1	2	2	3	2	1	2	2	2	1	1	1	1	1	1	1	1	2	2	3	39	
0623	2	2	2	2	2	2	2	2	1	3	2	2	2	2	2	2	2	2	1	1	1	1	1	1	2	3	42	
0624	2	1	1	1	1	2	2	1	2	1	0	2	2	1	2	2	2	2	2	1	1	1	1	2	1	2	35	
0625	2	2	2	2	2	1	1	1	2	2	1	1	1	1	1	1	1	1	1	2	2	1	2	2	1	2	35	
0626	2	2	3	2	2	1	1	2	2	2	2	2	1	1	1	1	2	2	2	2	1	2	2	2	2	3	42	
0627	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	0	1	1	1	1	1	1	2	1	2	2	36	
0628	1	1	1	1	2	1	2	2	2	2	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	32	
0629	1	1	1	1	1	1	0	1	*	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	37	
0630	1	1	1	1	2	2	2	2	2	1	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	44	

824

AVG.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2		
MAX.	2	2	3	2	2	2	2	3	2	3	3	3	2	2	2	2	3	2	2	2	3	2	3	2		3	

\*\*=Power or Equip. failure:      \*=Calibration

## DAILY AVERAGE, MAXIMUM AND TOTAL H2S READINGS

June 1 To June 30, 1990

Date	Fenceline			SOH-1			Gilman			Woods		
	Avg	Max	Total	Avg	Max	Total	Avg	Max	Total	Avg	Max	Total
0601	2	3	39	1	2	24	1	3	34	2	3	37
0602	2	3	36	2	2	39	2	3	42	2	2	40
0603	1	2	32	1	2	33	2	3	40	2	3	44
0604	2	4	53	1	2	34	2	3	40	2	3	47
0605	2	3	41	1	2	33	2	3	41	2	3	43
0606	2	3	43	-	-	-	2	3	42	2	3	42
0607	2	3	36	-	-	-	1	3	35	2	3	36
0608	2	2	27	-	-	-	2	3	41	1	3	35
0609	1	2	23	-	-	-	1	2	35	2	3	38
0610	1	2	29	-	-	-	1	3	30	1	2	28
0611	1	2	28	-	-	-	2	3	40	2	3	37
0612	1	3	34	-	-	-	2	2	45	2	3	43
0613	1	2	31	1	3	24	2	3	43	2	3	39
0614	1	2	35	1	2	34	2	4	44	2	3	44
0615	1	2	29	2	2	36	1	2	30	1	3	31
0616	1	3	22	2	3	44	1	2	35	2	3	36
0617	1	3	22	2	3	42	2	3	40	1	2	30
0618	2	3	45	1	2	31	1	2	31	1	3	34
0619	1	3	24	2	2	38	1	2	28	1	3	31
0620	1	3	14	2	2	37	1	2	26	1	3	35
0621	1	3	26	1	2	33	1	2	18	1	2	27
0622	1	3	14	2	3	39	1	2	30	1	2	35
0623	2	3	45	2	3	42	1	3	33	2	3	48
0624	2	3	39	1	2	35	1	2	29	2	3	29
0625	1	2	19	1	2	35	2	3	37	2	3	37
0626	-	-	-	2	3	42	1	2	33	2	3	45
0627	-	-	-	2	2	36	1	2	28	2	3	42
0628	-	-	-	1	2	32	1	3	29	2	3	40
0629	-	-	-	2	2	37	2	2	38	2	3	41
0630	-	-	-	2	3	44	1	2	32	2	3	42
	1	4	784	2	3	824	1	4	1029	2	3	1148

All readings are in parts per billion (ppb)

# Synopsis of Average Daily Meterological Station Readings

06/1989

T. P. MET

WOODS MET

DAY	TEMP	WD	WS	RAIN	RH	TEMP	WD	WS	RAD	RAIN	RH	SIGMA
01	22.6	341	7.0	0.01	-	23.5	349	3.5	210	0.02	-	39.3
02	23.0	1	7.3	0.00	-	23.4	18	3.5	186	0.02	-	42.8
03	23.0	355	5.2	0.05	-	23.2	360	3.2	114	0.03	-	46.8
04	22.7	322	4.5	0.05	-	22.9	328	2.9	126	0.15	-	37.0
05	23.1	336	4.4	0.08	-	22.5	23	3.5	156	0.17	-	29.0
06	22.9	53	4.3	0.13	-	22.9	18	3.0	190	0.25	-	38.1
07	23.0	14	4.6	0.20	-	23.4	49	3.5	140	0.06	-	38.9
08	23.0	353	6.7	0.04	-	23.5	31	3.4	164	0.00	-	45.4
09	22.7	329	6.5	0.01	-	23.2	33	4.0	188	0.03	-	42.5
10	22.0	345	5.7	0.08	-	22.4	36	2.8	166	0.05	-	36.8
11	23.0	351	5.8	0.03	-	23.6	22	3.0	228	0.06	-	35.8
12	22.2	349	6.0	0.30	-	22.6	361	2.8	142	0.16	-	40.3
13	22.2	346	5.8	0.14	-	22.8	22	3.4	190	0.17	-	35.2
14	21.4	336	6.3	0.66	-	21.9	356	4.6	118	0.58	-	35.8
15	22.5	330	5.5	0.22	-	22.5	360	3.4	130	0.16	-	43.5
16	21.5	351	6.0	0.33	-	22.5	1	3.1	168	0.32	-	45.1
17	22.4	29	8.5	0.05	-	23.2	24	4.5	172	0.02	-	51.0
18	22.4	339	6.1	0.19	-	22.9	346	4.9	206	0.19	-	37.7
19	22.1	330	5.8	0.06	-	22.5	340	4.8	128	0.10	-	34.3
20	21.7	337	5.8	0.72	-	22.0	326	4.9	82	0.64	-	31.0
21	22.3	340	6.1	0.03	-	22.5	346	4.1	48	0.00	-	34.8
22	22.4	343	6.0	0.04	-	23.1	358	4.8	164	0.05	-	41.6
23	21.8	334	7.1	0.12	-	22.3	351	5.6	164	0.24	-	39.4
24	22.8	18	7.5	0.04	-	23.2	13	5.1	136	0.02	-	48.7
25	22.8	5	6.7	0.06	-	23.1	15	4.4	180	0.01	-	58.7
26	21.1	319	4.9	0.11	-	21.8	63	3.7	112	0.12	-	41.8
27	22.0	359	5.5	0.38	-	22.7	345	3.7	114	0.23	-	36.2
28	22.0	325	6.5	0.21	-	22.7	335	5.0	182	0.17	-	36.7
29	22.5	337	7.1	0.31	-	23.4	357	5.5	206	0.31	-	42.3
30	23.3	328	5.8	0.14	-	23.5	14	5.1	176	0.09	-	46.3
AVG	22.4	347	6.0	0.16	0	22.9	7	4.0	156	0.15	0	40.4
MAX	23.3	-	8.5	0.72		23.6	-	5.6	228	0.64		58.7
MIN	21.1	-	4.3	0.00	1000	21.8	-	2.8	48	0.00	1000	29.0
TOT				4.79					4686	4.42		

Meteorology Station Log  
 50H-41  
 6-1-90 to 6-30-90

Time	W/D	W/S	W/D	W/S	W/D	W/S	W/D	W/S
	0601		0602		0603		0604	
0000	-	-	360	5	30	9	40	4
0100	-	-	10	4	335	3	35	4
0200	-	-	360	3	350	4	30	3
0300	-	-	340	3	360	4	360	3
0400	-	-	320	4	360	4	280	2
0500	-	-	310	6	315	3	265	3
0600	-	-	290	4	340	4	310	3
0700	-	-	280	4	320	3	280	2
0800	-	-	300	3	300	3	280	4
0900	-	-	315	2	275	4	300	5
1000	-	-	320	4	285	4	315	6
1100	360	9	350	7	305	4	315	6
1200	10	10	360	8	15	8	5	8
1300	20	9	360	9	10	6	350	5
1400	15	10	20	10	35	7	55	8
1500	15	10	35	12	55	8	40	8
1600	15	10	35	13	45	8	40	6
1700	15	9	40	14	45	8	15	5
1800	15	8	40	9	40	8	5	6
1900	10	6	25	11	40	5	280	3
2000	10	5	20	9	45	4	265	5
2100	10	5	20	8	50	3	300	2
2200	15	5	360	4	35	3	265	3
2300	5	4	350	4	20	3	270	3

Time	W/D	W/S	W/D	W/S	W/D	W/S	W/D	W/S
	0605		0606		0607		0608	
0000	310	4	250	3	40	2	40	2
0100	280	2	340	3	40	2	360	3
0200	270	3	45	3	40	2	295	3
0300	260	4	65	2	20	2	310	4
0400	270	4	250	3	275	2	305	2
0500	275	5	200	2	270	2	285	2
0600	260	4	95	3	265	3	270	2
0700	340	6	105	2	250	3	275	2
0800	30	10	125	3	265	3	315	5
0900	25	9	310	4	320	5	345	7
1000	35	6	350	7	25	6	40	9
1100	45	4	20	8	35	8	50	10
1200	250	4	40	8	40	8	45	10
1300	310	4	40	6	65	7	45	9
1400	-	-	45	6	85	7	40	10
1500	-	-	40	8	90	6	60	8
1600	-	-	45	5	80	4	45	8
1700	-	-	25	4	25	5	25	7
1800	-	-	20	3	40	4	35	6
1900	-	-	25	2	35	4	25	3
2000	-	-	35	2	30	3	360	4
2100	-	-	40	2	25	2	10	6
2200	-	-	40	2	15	2	355	4
2300	-	-	40	2	40	2	320	4

Time	W/D	W/S	W/D	W/S	W/D	W/S	W/D	W/S
	0609		0610		0611		0612	
0000	310	4	270	3	-	-	-	-
0100	300	3	270	3	-	-	-	-
0200	290	4	280	3	-	-	-	-
0300	310	4	-	-	-	-	-	-
0400	305	4	-	-	-	-	-	-
0500	295	4	-	-	-	-	-	-
0600	325	7	-	-	-	-	-	-
0700	5	7	-	-	-	-	-	-
0800	10	9	-	-	-	-	-	-
0900	20	11	-	-	-	-	-	-
1000	15	10	-	-	-	-	-	-
1100	20	11	-	-	-	-	-	-
1200	10	10	-	-	-	-	-	-
1300	15	10	-	-	-	-	-	-
1400	15	9	-	-	-	-	-	-
1500	25	8	-	-	-	-	-	-
1600	20	6	-	-	-	-	-	-
1700	360	4	-	-	-	-	-	-
1800	330	3	-	-	-	-	-	-
1900	320	3	-	-	-	-	-	-
2000	320	2	-	-	-	-	-	-
2100	295	2	-	-	-	-	-	-
2200	275	2	-	-	-	-	-	-
2300	275	3	-	-	-	-	-	-

Time	W/D	W/S	W/D	W/S	W/D	W/S	W/D	W/S
	0613		0614		0615		0616	
0000	-	-	-	-	10	2	10	2
0100	-	-	-	-	10	2	285	3
0200	-	-	-	-	340	2	275	4
0300	-	-	-	-	275	2	275	2
0400	-	-	-	-	270	2	275	2
0500	-	-	-	-	275	2	35	2
0600	-	-	-	-	280	3	10	3
0700	-	-	310	5	290	3	305	3
0800	-	-	315	5	310	3	30	5
0900	-	-	310	5	355	6	40	7
1000	-	-	330	3	5	8	40	8
1100	-	-	340	5	10	9	25	8
1200	-	-	35	8	20	10	20	9
1300	-	-	40	11	15	10	25	9
1400	-	-	50	11	10	9	35	6
1500	-	-	40	8	360	9	15	7
1600	-	-	85	7	5	7	320	4
1700	-	-	45	4	360	7	315	4
1800	-	-	20	3	15	5	285	3
1900	-	-	335	3	320	4	35	3
2000	-	-	310	3	300	3	25	2
2100	-	-	55	2	295	3	20	4
2200	-	-	50	2	325	4	50	3
2300	-	-	315	3	345	5	45	3

Time	W/D	W/S	W/D	W/S	W/D	W/S	W/D	W/S
	0617		0618		0619		0620	
0000	45	2	310	4	290	3	285	3
0100	45	2	270	3	315	2	265	4
0200	50	4	315	4	350	6	255	5
0300	70	2	275	3	310	3	265	4
0400	45	3	285	3	275	4	280	3
0500	45	3	265	3	270	4	265	2
0600	45	5	330	4	280	4	265	2
0700	45	8	20	5	270	4	265	3
0800	65	7	20	8	295	4	90	4
0900	55	7	15	7	335	5	340	3
1000	50	8	20	8	350	5	5	4
1100	50	8	25	8	10	7	35	6
1200	50	8	20	9	20	8	45	7
1300	35	9	360	8	25	8	40	5
1400	30	10	355	8	30	9	65	4
1500	25	10	355	7	25	6	45	5
1600	20	8	355	8	360	4	45	5
1700	30	6	345	7	360	5	10	3
1800	20	4	340	7	355	3	5	3
1900	15	4	10	4	10	2	30	3
2000	15	6	10	4	325	2	270	4
2100	15	5	10	4	290	3	275	4
2200	340	4	5	3	260	2	280	3
2300	290	3	280	3	270	2	275	3

Time	W/D	W/S	W/D	W/S	W/D	W/S	W/D	W/S
	0621		0622		0623		0624	
0000	280	3	275	3	275	4	25	4
0100	280	4	315	3	285	3	35	3
0200	285	3	20	4	260	4	40	4
0300	280	3	360	3	255	4	30	5
0400	290	2	315	2	260	5	40	6
0500	295	3	310	2	265	4	25	5
0600	290	3	315	2	260	4	10	3
0700	300	3	20	4	280	4	40	4
0800	330	4	15	9	290	5	55	7
0900	25	8	10	10	315	5	45	8
1000	35	9	25	12	345	7	40	9
1100	25	10	30	11	360	6	40	10
1200	30	9	30	11	10	8	40	9
1300	15	9	15	9	15	9	45	9
1400	20	8	20	12	20	10	25	9
1500	10	8	10	12	20	11	20	8
1600	15	7	10	9	40	10	15	8
1700	20	7	5	9	40	10	15	8
1800	10	4	360	6	30	6	20	7
1900	10	3	360	7	35	5	15	5
2000	360	3	335	4	20	4	360	4
2100	350	3	325	3	25	4	10	4
2200	350	3	285	3	30	5	350	3
2300	310	2	275	4	35	5	15	4



Time	W/D	W/S	W/D	W/S	W/D	W/S	W/D	W/S
	0625		0626		0627		0628	
0000	10	4	285	3	85	2	280	4
0100	10	4	290	4	85	2	275	3
0200	360	3	310	5	80	2	275	4
0300	350	5	330	5	60	2	275	3
0400	10	4	5	7	45	3	275	4
0500	15	4	360	8	340	2	265	4
0600	360	3	15	9	300	3	270	4
0700	30	8	345	4	80	2	290	4
0800	25	9	290	4	75	2	315	5
0900	30	9	300	4	10	4	345	7
1000	30	10	325	5	15	6	360	8
1100	35	10	340	4	40	8	5	8
1200	25	8	360	3	40	9	20	10
1300	20	6	360	3	40	8	30	10
1400	25	5	360	2	45	8	25	12
1500	25	5	360	2	45	7	25	13
1600	10	4	360	2	35	7	20	9
1700	360	3	40	3	30	7	360	7
1800	315	3	30	3	25	5	350	6
1900	290	3	40	4	15	3	340	6
2000	290	4	35	3	360	2	350	5
2100	290	4	90	2	325	2	345	4
2200	290	4	90	2	285	3	310	5
2300	295	4	85	5	285	4	290	5

Time	W/D	W/S	W/D	W/S	W/D	W/S	W/D	W/S
	0629		0630					
0000	335	5	325	4				
0100	360	7	355	4				
0200	350	5	320	4				
0300	290	4	305	3				
0400	285	4	310	4				
0500	300	4	305	3				
0600	300	4	295	3				
0700	295	4	290	3				
0800	310	4	290	3				
0900	350	7	300	5				
1000	25	11	330	6				
1100	30	12	350	8				
1200	25	12	350	8				
1300	25	12	350	8				
1400	20	12	360	9				
1500	15	13	10	9				
1600	10	9	10	9				
1700	360	10	20	8				
1800	345	8	20	8				
1900	355	7	15	7				
2000	340	5	15	8				
2100	340	6	20	8				
2200	335	5	20	9				
2300	345	5	15	7				